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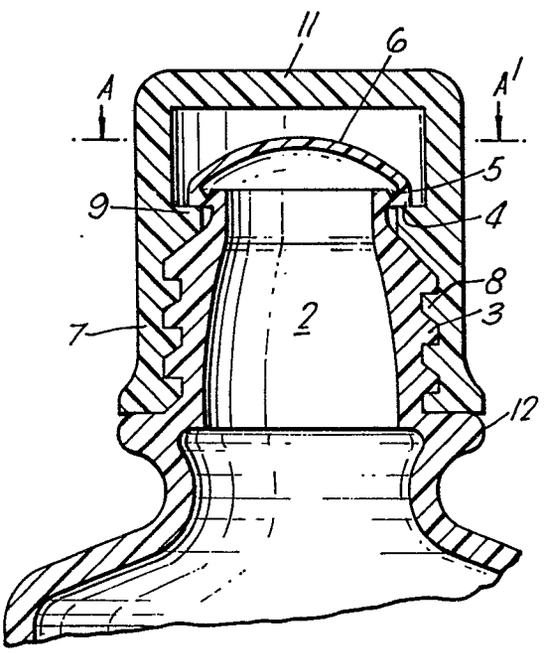
## (54) Bottles.

(57) A moulded plastics bottle for sterile liquids comprising

a) a threaded neck, the neck having a frangible annular portion above the threaded portion and also having an integral seal moulded onto the neck to close the bottle, and

b) a cap having a thread complementary with the thread of the neck, the cap containing an internal annular ring comprising at least two inwardly directed fingers which engage with the downward facing edge of the annular portion of the neck, whereby unscrewing of the cap causes upward movement of the fingers so that the frangible portion is broken and the seal is removed to reveal the contents of the bottle.

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CASE 85/05237

# BOTTLES

This invention relates to plastic bottles for sterile liquids.

A large variety of bottles and related closure systems have been proposed. One such is that described in GB Patent 2080775. In this a closure element, which is separately formed from the bottle, is heat sealed onto the neck of the bottle. The line where the closure is sealed onto the bottle is weaker than the rest of the bottle so that the closure can be broken off. This is achieved by having a jacking ring comprising fingers which snap into a recess above the heat seal and as the jacking ring is unscrewed upwards the cover is removed.

In another type of bottle shown in EP 50490 a cover is formed over the neck during the moulding operation. The threaded neck has an annular portion above the thread. During the moulding operation a V-shaped groove is formed in the annular portion to provide a frangible section. The bottle carries a cap, and is opened by screwing the cap downwards thereby breaking the frangible portion. A ring inside the upper part of the cap then locates inside an annular groove in the cover so that on unscrewing the cap, the sheared-off cover can be removed from the neck.

We have now devised an improved bottle which can be manufactured in a simple manner and which results in easy

opening of the bottle.

Thus according to the invention there is provided a moulded plastics bottle for sterile liquids comprising

a) a threaded neck, the neck having a frangible annular portion above the threaded portion and also having an integral seal moulded onto the neck to close the bottle, and

b) a cap having a thread complementary with the thread of the neck, the cap containing an internal annular ring comprising at least two inwardly directed fingers which engage with the downward facing edge of the annular portion of the neck, whereby unscrewing of the cap causes upward movement of the fingers so that the frangible portion is broken and the seal is removed to reveal the contents of the bottle.

The invention is illustrated with reference to the accompanying drawings in which:

Figure 1 is a side view of a bottle with the cap in position

Figure 2 is sectional view of the neck of the bottle with the cap in position, and

Figure 3 is a view of the cap only along the line AA in Figure 1.

Figure 4 is a partial side view of a bottle with a modified cap.

Referring to the drawings, the bottle 1 comprises a neck 2 having a thread 3. An annular portion 4 has a V-shaped groove 5 which makes the portion 4 frangible. A seal 6 is moulded onto the neck to close the bottle. A cap 7, having thread 8 complementary to the thread 3 of the neck, is screw fitted onto the neck. A ring consisting of fingers 9 engage the annular portion 4. The fingers are sufficiently flexible to slide over the seal 6 as the cap is screwed into the position as shown in Figure 2. Unscrewing the cap causes it to rise and the fingers break the frangible portion as they rise with the cap. The cover then continues upwards and is removed with the cap. The contents of the bottle can then be poured out.

In one embodiment of the invention the top portion of the cap 11, is sufficiently close to the seal 6 so that it is reasonably well contained by the cap. The cap can then be screwed back onto the bottle taking the seal with it and hence reseal the bottle. Downward movement of the cap is limited by an annular abutment 12.

The bottle is generally formed by blow moulding a suitable plastics material e.g. polyethylene, polypropylene or polyethylene terephthalate. In the initial moulding phase a neck portion is formed without a seal. The bottle is then filled with liquid.

The neck portion at this stage has sufficient plastic

above the threaded portion so that the seal can be formed from this remaining plastic in a second moulding stage. During the second moulding stage the V-shaped groove is also formed by use of a suitable die. The seal is an integral part of the bottle.

In another embodiment shown in figure 4, the finger 13 is formed during moulding of the cap. The cap is generally formed by injection moulding. To form the finger, a ram is inserted to create a groove 14. A corresponding female tool shapes the finger. After the cap has been formed the tool can be collapsed and the ram withdrawn so that the cap can be removed from the mould. An annular tear-off band 15, which abuts abutment 12, prevents downward movement of the cap until the band has been removed. This is done by pulling on flange 16 which is attached to the band. To open the bottle, the band is torn off and the cap screwed down. As described for the previous embodiment, the fingers 13 are sufficiently flexible to slide over the seal 6. The fingers then engage the frangible portion 4 so that on unscrewing the cap, portion 4 breaks, as described previously, the seal can be removed and the contents of the bottle poured out.

Because in both embodiments, the fingers 9 or 13 directly engage the frangible portion of the neck a much cleaner break can be achieved, as compared for example

with the bottle shown in GB 2080775, where fingers engage a groove remote from the frangible section. In this bottle, as the jacking ring lifts the closure member, the closure member can stretch, so that breakage of the frangible section is not necessarily achieved in such a satisfactory manner.

CLAIMS

1) A moulded plastics bottle for sterile liquids comprising

a) a threaded neck, the neck having a frangible annular portion above the threaded portion and also having an integral seal moulded onto the neck to close the bottle, and

b) a cap having a thread complementary with the thread of the neck, the cap containing an internal annular ring comprising at least two inwardly directed fingers which engage with the downward facing edge of the annular portion of the neck, whereby unscrewing of the cap causes upward movement of the fingers so that the frangible portion is broken and the seal is removed to reveal the contents of the bottle.

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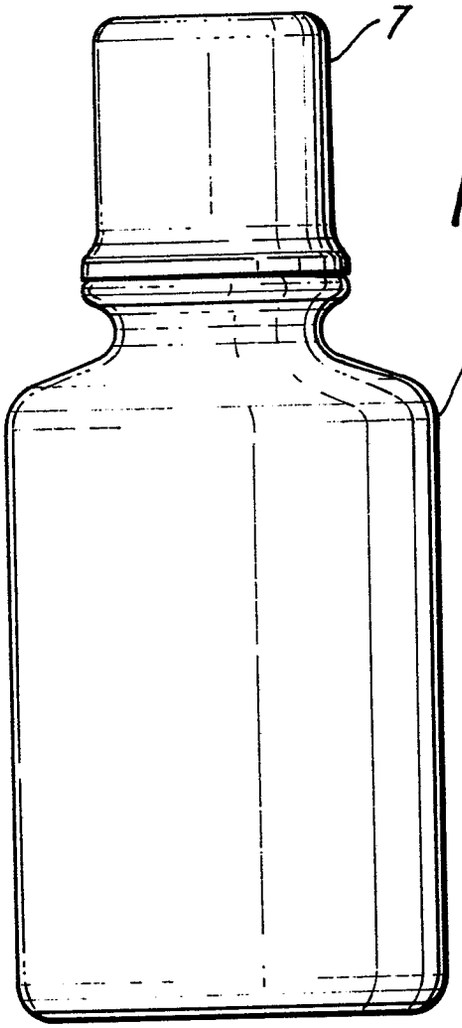


Fig. 1.

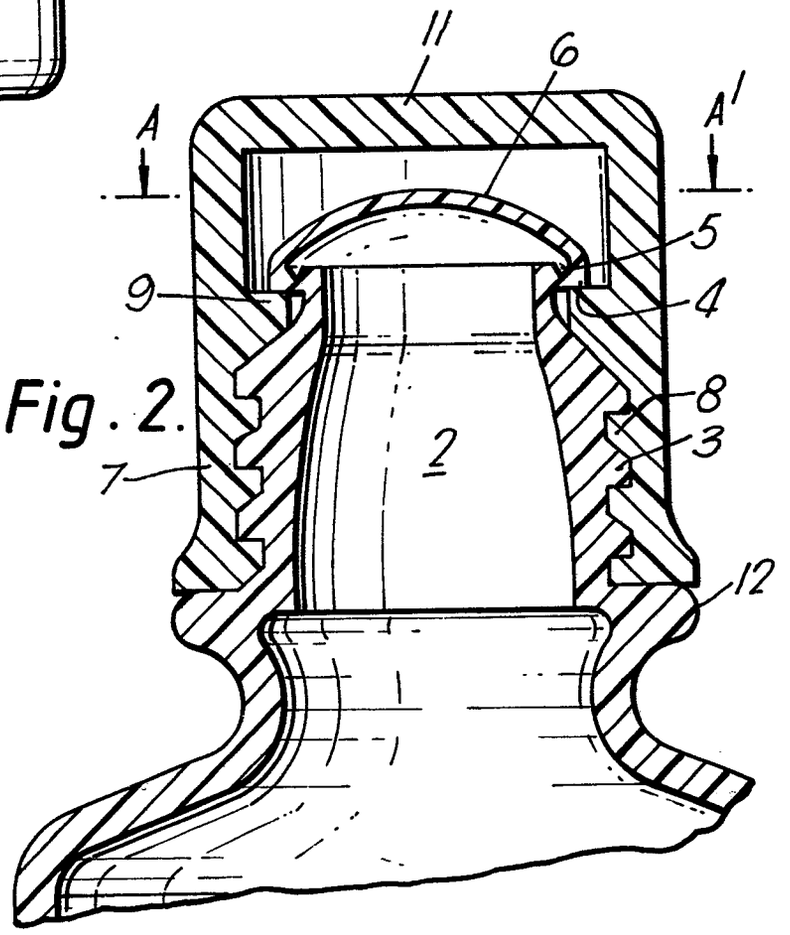


Fig. 2.

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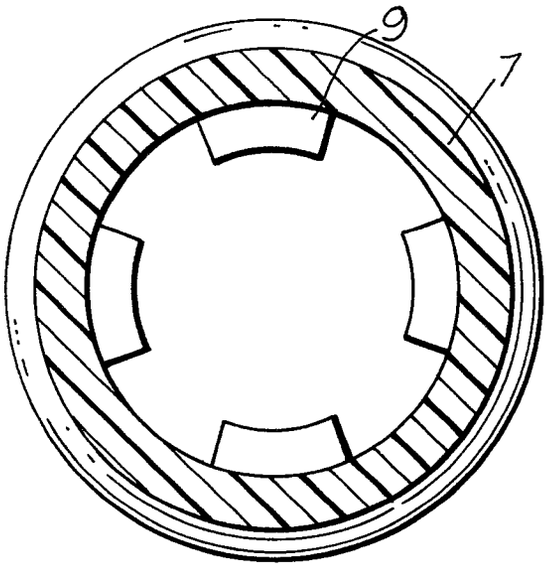
Fig. 3.



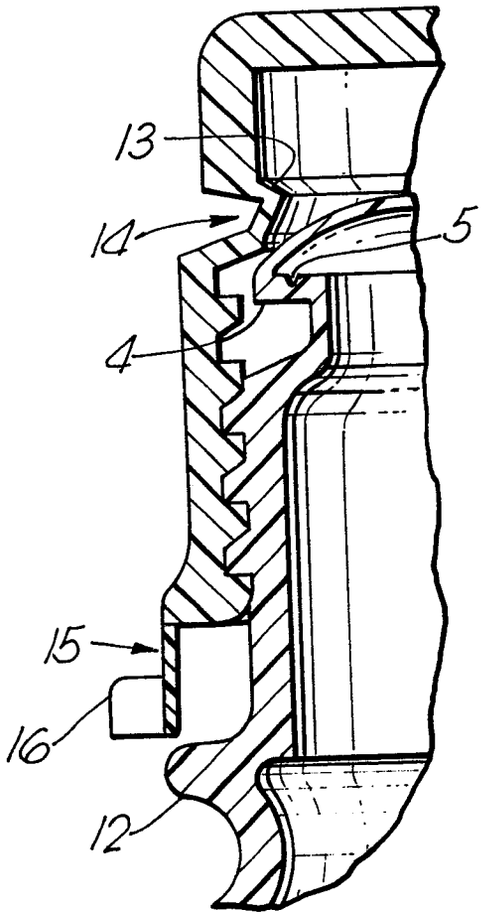




Fig. 4.